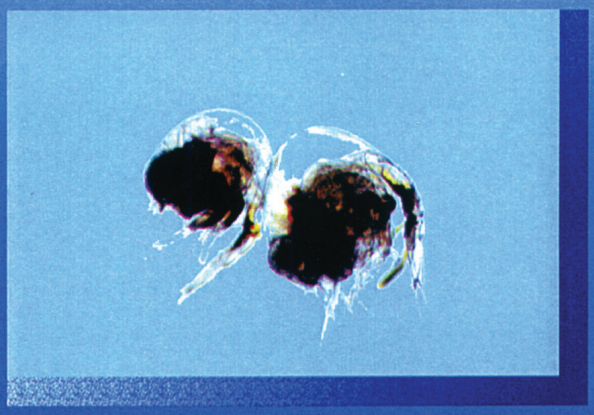
The Lifecycle of a Shore Crab



Activity Unit Includes:

- Interactive poster
- Teacher notes
- Student activities

NEW ZEALAND
MARINE STUDIES CENTRE

The photographs on this page are intended to be cut out and used with the posters.

Story -The life cycle of a shore crab

Crabs live on rocky seashores and hide underneath rocks when the tide is low. Mating often occurs in spring and summer. The adult male and female come belly to belly and wrap their jointed limbs around each other in an armour plated embrace. Sperm is transferred from the male to the female.

Once fertilized, the eggs are carried under the wide tail of the female. Each egg is attached by a fine stem to the tail of the mother. They are well protected from predators and damage. Inside each egg there is a store of yolk for the developing crab to feed on during the one to two month incubation period.

Baby or larval crabs called **zoea larvae** hatch from their eggs and drift away from their mother. They have a crusty outer skin and jointed limbs, are transparent, have a segmented tail used for swimming and spikes on their upper body for protection.

Once released the mother never sees her young again. Along with hundreds of thousands of brothers and sisters they drift along with the ocean current. Now part of the **plankton community** they filter the water to find smaller plankton to eat. Life in the plankton is hazardous. Their clear colour makes them hard for predators to see, but this does not stop fish and invertebrates feeding on them.

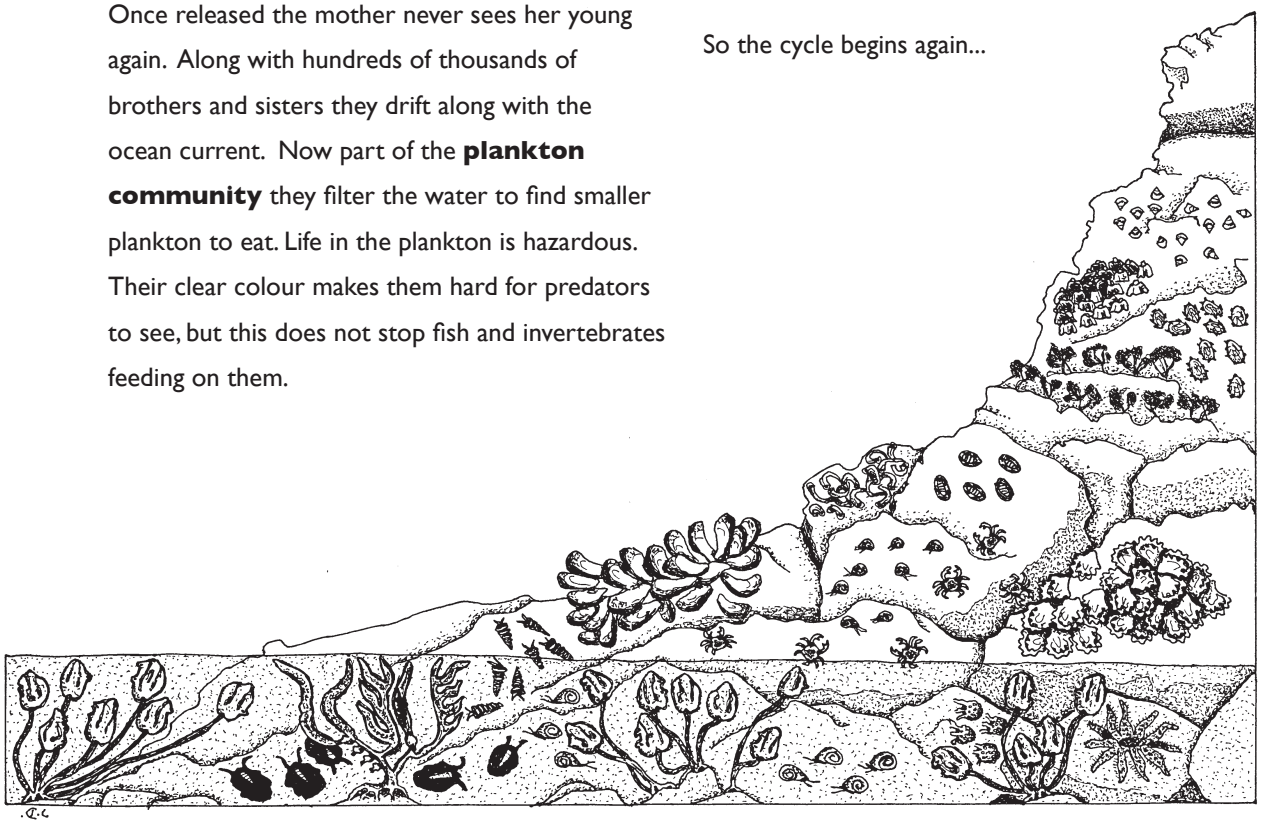
These larvae increase in size through a process called **moulting**. To grow, the larval crab sheds its outer skin and forms a larger one. After moulting 4-5 times the crab changes into a **megalopa larva.**

This stage looks more like the parent. It has little nippers and 4 jointed legs on either side. Its tail is still visible and is used for swimming. This stage lasts for a couple of days, then settling to the bottom and changes into a juvenile crab.

The juvenile is a tiny version of the parent. The outer skin now has colour to match the surroundings. The tail is tucked underneath the crabs body and the legs are developed for crawling around the rocks. For many species their diet changes from filtering plankton to scavenging for dead plant and animal material or preying on other bottom dwelling invertebrates.

But growing hasn't stopped yet. The tiny crab moults repetitively until it reaches the adult stage and is large enough to mate with another crab.

So the cycle begins again...



Crabby Concepts of Rocky Shore Crabs

Classifying Crabs

Crabs are members of the *Phylum arthropoda* and *subphylum crustacea.*

They all have :

- Exoskeleton - a crusty outer skin.
- Jointed and paired limbs.

Anatomy

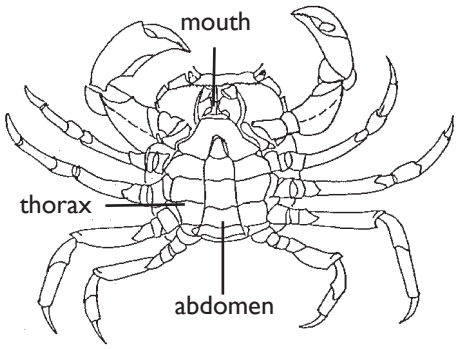
The crab body is protected by a tough outer shell called an **exoskeleton**.

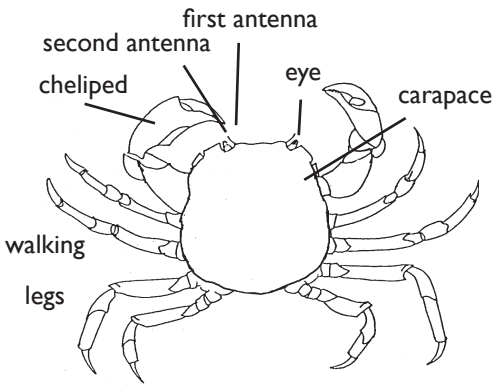
The **head** and **thorax** are joined together and are covered by a shell called a **carapace.**

Crabs have 4 pairs of walking legs and one pair of nippers called **chelipeds**.

The mouth is a complex structure of many moving parts.

Crabs have 2 sets of **antennae** used for sensing their environment.





Moulting

Crabs grow by moulting. The exoskeleton is shed and a new larger one is formed. It takes a few days for their shell to harden. During this time crabs are very vulnerable to predators. Juvenile and mature crabs will hide under rocks while their skin is still soft.

Protection

Larval crabs are transparent and have spikes on their body for protection from predators. Although unable to swim against the current they zoom around in the water column to avoid being eaten by predators.

Juvenile and mature crabs have an exoskeleton and large nippers called **chelipeds** for protection. Their colour is similar to their habitat for camouflage.

Their behaviour also aids survival. When the tide is out crabs will hide under rocks for protection from predators and in order to stay cool and moist. They are more active at night and when the tide is in.

Plankton

Plankton are known as the drifters of the sea. Most are tiny and are unable to swim against a current. **Phytoplankton** are producers and **zooplankton** are consumers. Permanent plankton spend their entire lifetime drifting with currents. Temporary plankton, like crab larvae, only spend part of their life in the plankton.

The planktonic larval stage is an important method for dispersal of young and for increasing the genetic variation within the species.

Habitat

Adult shore crabs live in a different habitat to larval crabs which means they are not competing for space or food.

Juvenile and mature shore crabs are able live on the rocky shore because they can survive for short periods out of water and can tolerate changes in salinity and temperature.

Locomotion

Larval crabs drift with the water current, they are able to swim but are too small to swim against the current. Juvenile and adult crabs are bottom dwelling, they crawl sideways and leave interesting tracks on the shore.

Science in the NZ Curriculum Links & Specific Learning Outcomes

Using the Posters for Learning Experiences

Levels 1 & 2

Nature of Science

• **Investigating** • **Communicating**

Living World:

• ***Life Processes*** – Recognise that all living things have certain requirements so that they can stay alive.

• ***Ecology*** – Recognize that living things are suited to their particular habitat.

• ***Evolution*** – Recognise that there are lots of different living things in the world and that they can be grouped in different ways.

Specific Learning Outcomes:

• Share their knowledge of crabs.

• Identify the parts of a crab.

• Distinguish between male and female crabs.

• Retell the life cycle of the shore crab.

• Explain that crabs grow by moulting.

• Look at the life cycle of the butterfly. Read *The Very Hungry Caterpillar* by Eric Carle. Did you know that crabs have very different stages in their life cycle too?

• Introduce poster. Read the story of the crab referring to the poster (cut out the crab cutouts and blu-tak these to the poster as you read).

• Children create their own life cycle poster and retell it to a partner for oral language. They can either draw their own pictures or cut and paste the diagrams on Activity Sheet 3.

• Using Activity Sheet 1, name and label the crab parts. Discuss what each part is used for e.g. protection, finding food, holding eggs, tearing food, moving or swimming.

Levels 3 & 4

Nature of Science

• **Investigating** • **Communicating**

Living World:

• ***Life Processes*** – Recognise that there are life processes common to all living things and that they occur in different ways.

• ***Ecology*** – Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced.

• ***Evolution*** – Begin to group plants, animals and other living things into science-based classifications.

Specific Learning Outcomes:

• Explain the special features of the shore crabs that ensure survival at each stage of their life cycle.

• Describe where and how shore crabs live.

• Investigate and describe the special features of shore crab reproduction that helps survival to the next generation e.g. plankton stage, producing large number of eggs.

• Discuss known life cycles-frogs, butterfly, salmon.

• Look at the five cutouts. These show stages in the life cycle of the shore crab. Group students and give each group a copy of the cutouts. Students predict the sequence of the life cycle using arrows and making captions about what they think is happening at each stage.

• Each group reports back with their ideas.

• Use the story, poster and cutouts to show the life cycle of the shore crab.

• Students construct their own life cycle chart using Activity Sheets 2 & 3.

• Students retell the life cycle in groups or pairs for oral language.

• Students identify and list survival features at each stage of the life cycle e.g. adult has a crusty outer shell to avoid drying out.

• Discuss and list features of the life cycle that ensure survival to the next generation.

Level 5

Nature of Science

• **Investigating** • **Communicating**

Living World:

• ***Life Processes*** – Identify the key structural features and functions involved in the life processes of plants and animals.

• ***Evolution*** – Describe the basic processes by which genetic information is passed from one generation to the next.

Specific Learning Outcomes:

• Explain the survival features at each stage of the life cycle (structural, physiological and behavioural).

• List the benefits of having a planktonic life cycle.

• Give an overview of the life cycle of the shore crab using posters.

• Split class into groups. Give each group a copy of the story and Activity Sheets 2 & 3.

• Ask each group to comment on: size, how they grow, how they move, what they eat, where they live and how they are protected from predators at each stage of the life cycle.

• Generate questions to investigate finer details of the crab life cycle e.g. how temperature affects the life cycle, the number of eggs produced, how long the larval stage stays in the plankton.

• Brainstorm ideas on how they might conduct investigations to answer these questions.

Reinforcing and Extending Ideas

Mural

Develop a classroom mural or big book based on the crab life cycle.

Time line

Construct a time line to show the development of a crab over time.

Drama

Recreate the lifecycle of the shore crab in dance and drama. Construct simple costumes out of paper or cardboard. Include crab predators and prey as characters in your drama.

Crustaceans

Compare the life cycles of other crustaceans e.g. crayfish, shrimps and barnacles.
Look for similarities and differences between their life cycles.

Use the poster as a model to produce posters which illustrate these different crustacean life cycles.

Food

Find out what shore crabs eat at different stages of their life cycle.

Make a list of crab predators.

Construct a food web that include shore crabs

Protection

Investigate the ways crabs protect themselves at different stages in their life cycle.

Compare strategies used by different species of crab e.g. tunnelling mud crab, camouflage crab, hermit crab.

Temperature

Find out how temperature effects development. Find a crab with eggs. Carefully remove some and place in a beaker of seawater.

Place one sample in the fridge and one sample at room temperature.

Using a microscope observe and compare their development over time.

Human Impact

Discuss human impact at different stages of the crab life cycle e.g. loss of habitat, pollution.

Reproduction

Explore different methods of reproduction in marine animals. e.g.

Asexual reproduction - dividing starfish and anemones.
Broadcast spawning – sea urchins, mussels.
Internal fertilisation - sharks, crabs.

Make a list of the advantages and disadvantages of each method.

Crab Anatomy

Explore the external features of the shore crab. Label the main external features (Activity Sheet 1).

Describe the functions of different parts of the crabs anatomy i.e. which parts are used for protection, locomotion, reproduction, feeding.

More from the New Zealand Marine Studies Centre

Survey your local beach

Visit your local beach and conduct a scientific survey of the local crab species. Suggestions for designing and conducting surveys are available from the NZ Marine Studies Centre

Crab ID wheels

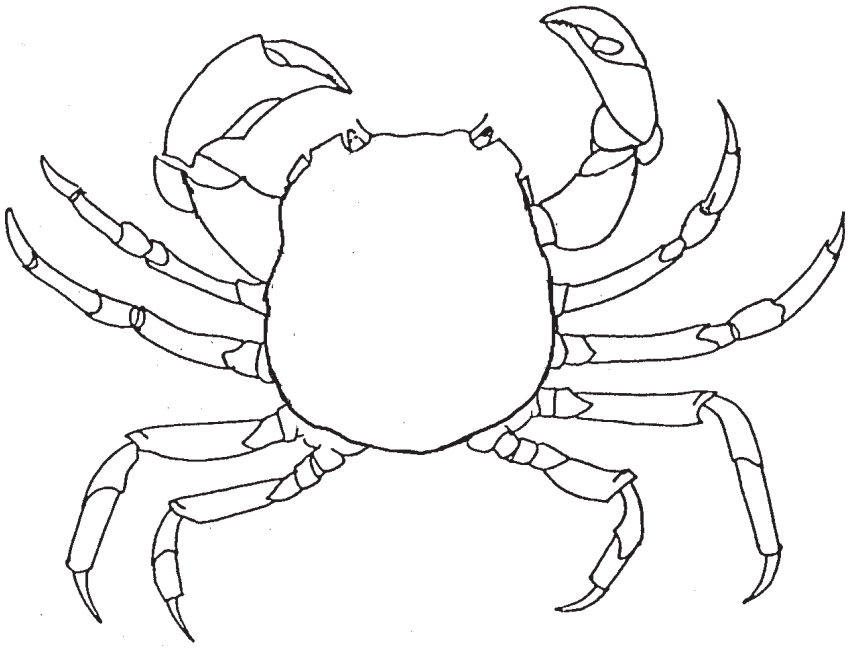
Available from the NZ Marine Studies Centre this wheel has been designed to help identify the most common crabs found anywhere in New Zealand.

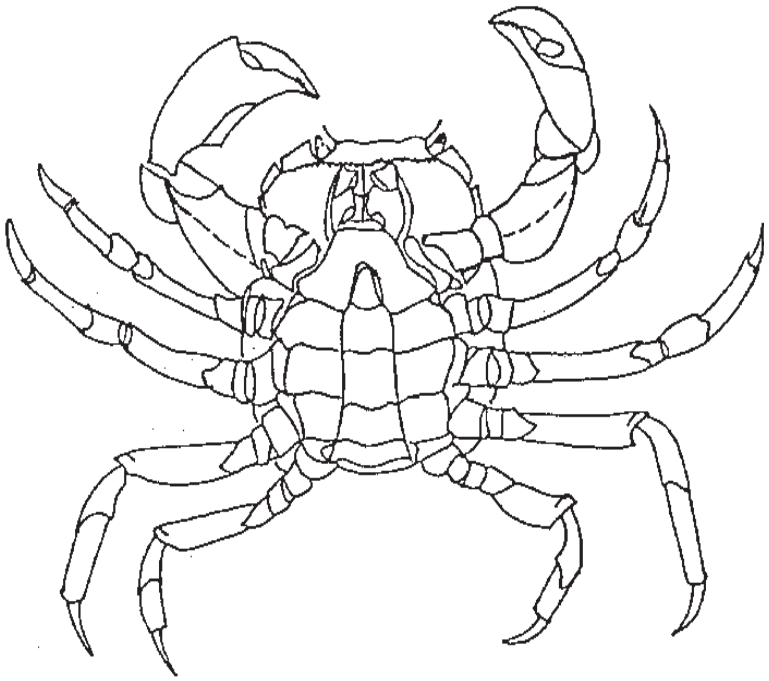
NZ Marine Studies Centre Crab Programme

Visit the NZ Marine Studies Centre and survey the local crab populations, look at life history stages under microscopes and become a scientist investigating the feeding strategies of these crusty creatures.

Activity Sheet 1

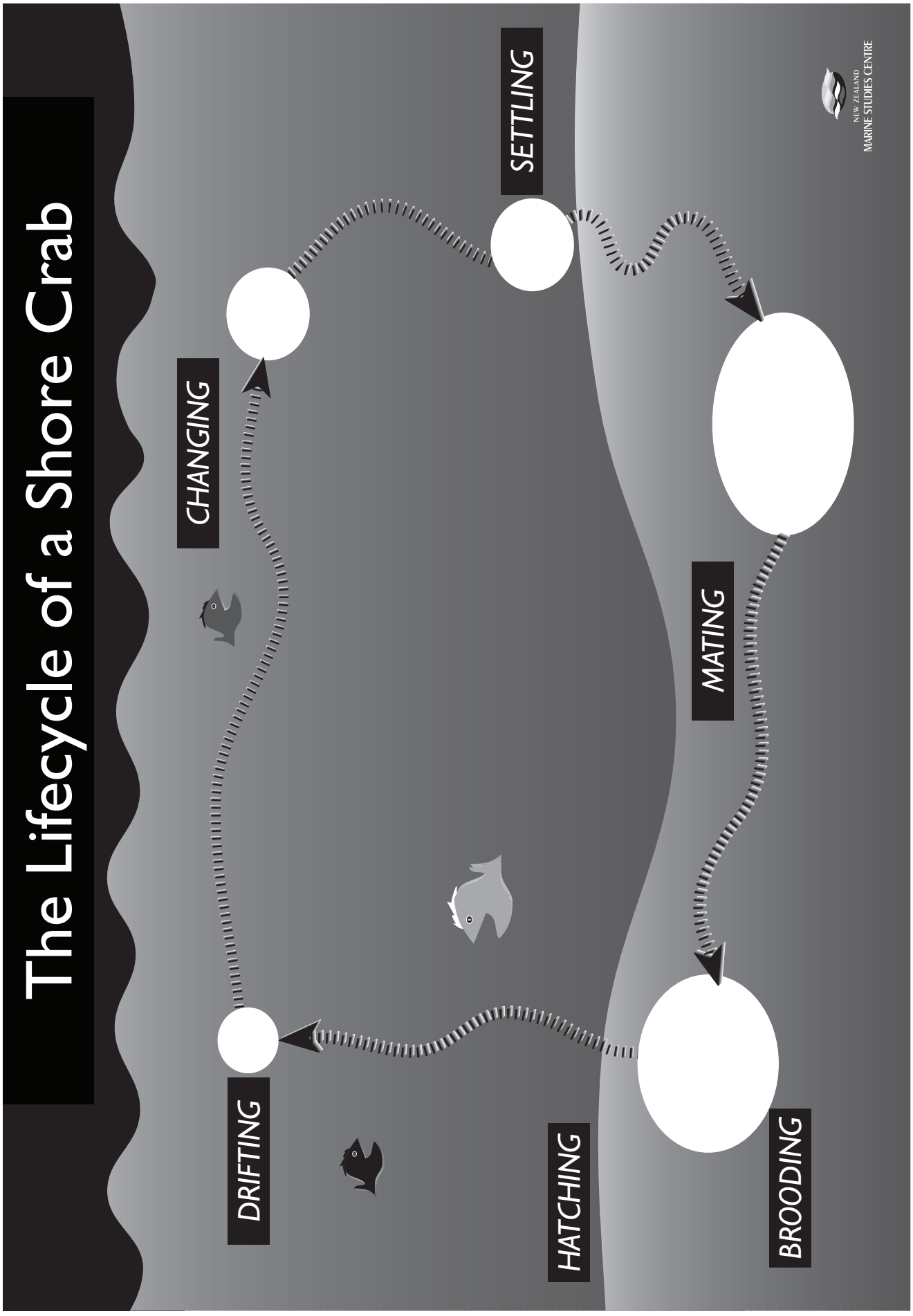
Label the following crab parts :





thorax	cheliped	carapace	mouth
mouth	first antenna	second antenna	
walking legs	eye	carapace	abdomen

Activity Sheet 2



Activity Sheet 3